

Name:
Algebra 2

Date:

Introduction to Graphing Polynomial Functions

This handout is to get you ready to graph polynomial functions with x^3 or x^4 in them.

1. **Without using your calculator**, evaluate the following for the polynomial functions $f(x)$, $g(x)$, and $h(x)$ below. Think about it: is a negative number cubed negative or positive?

$$f(x) = x^3 - 3x^2 + x + 5 \quad g(x) = -2(x+1)^3 + 4 \quad h(x) = -2x(x+1)(x-3)(x+4)$$

a. $f(1)$

b. $f(2)$

c. $f(-1)$

d. $g(1)$

e. $g(-2)$

f. $h(1)$

g. $h(-3)$

2. What are the y-intercepts of $f(x)$, $g(x)$, and $h(x)$ from question #1 above? Explain how you know.

3. Find the x-intercepts of the following functions algebraically. (For some problems you have to factor. Don't multiply them out!)

a. $f(x) = (x-1)(x+2)(x-5)$

b. $f(x) = 2x(x-4)(x+1)(x+5)$

c. $f(x) = x^3 - x^2 - 12x$

d. $f(x) = (x-6)(x^2-4)(x^2+5x+4)$

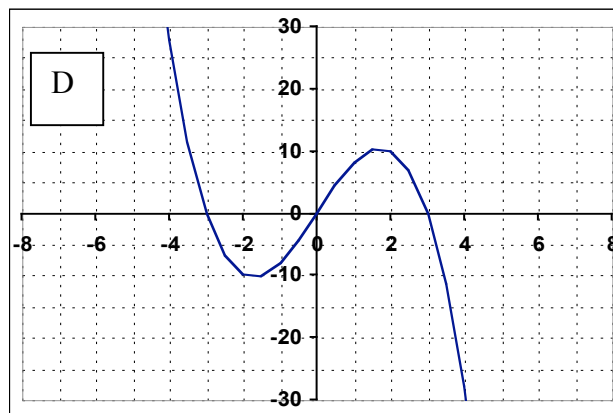
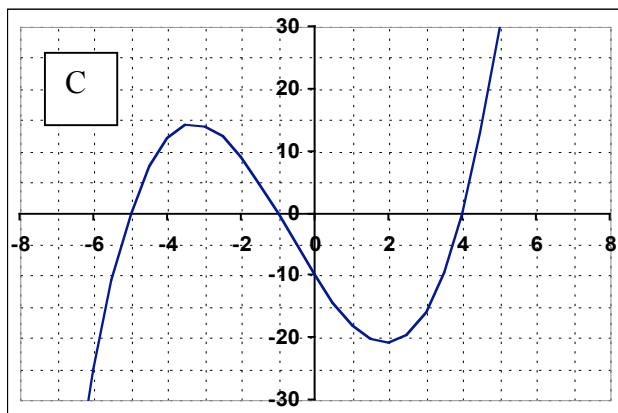
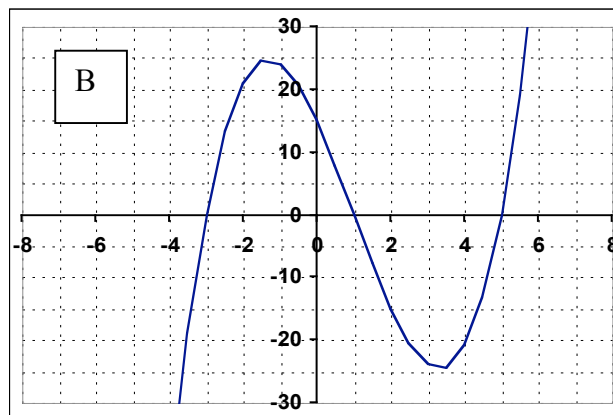
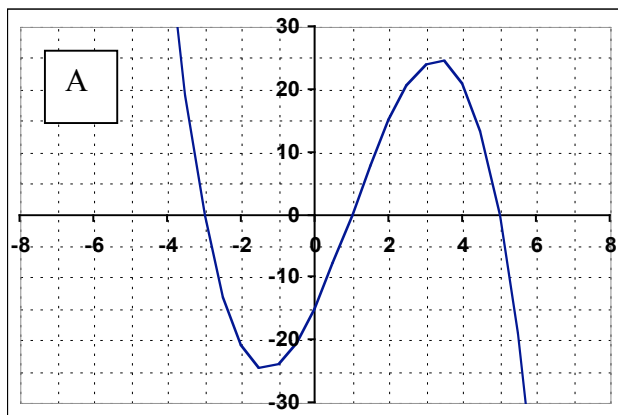
4. The four functions below have each been graphed. Match the graphs with the functions **without using your calculator. Use the x- and y-intercepts to guide you.**

$$f(x) = (x + 3)(x - 1)(x - 5)$$

$$h(x) = -x(x + 3)(x - 3)$$

$$g(x) = 0.5(x + 5)(x + 1)(x - 4)$$

$$k(x) = -1(x + 3)(x - 1)(x - 5)$$

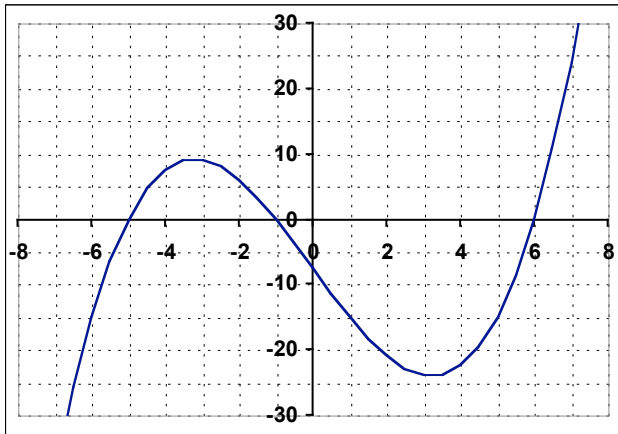


5. The graph below could be the graph of which of the following functions? **Hint: x-intercepts.** Circle all that apply. Assume a is a constant, and it may have a positive or a negative value.

$$f(x) = a(x+1)(x+6)(x-5)$$

$$h(x) = ax(x+1)(x+5)(x-6)$$

$$g(x) = a(x+1)(x+5)(x-6)$$



6. Find all real and imaginary zeros of the following functions algebraically. **Then determine how many x-intercepts they have.**

a. $f(x) = -2x^3 + 4x^2 + 48x$

b. $f(x) = (2x - 1)(x^2 + 2x - 35)$

c. $f(x) = -2x(x+3)(x^2 + 4x - 6)$

d. $f(x) = (2x - 1)(x^2 + x + 3)$

ANSWERS: 1a. 4 b. 3 c. 0 d. -12 e. 6 f. 40 g. 72 2. (0,5), (0,2), (0,0)
3a. 1, -2, 5 b. 0, 4, -1, -5 c. 0, 4, -3 d. 6, -2, 2, -4, -1 4. f(x) is B g(x) is C h(x) is D k(x)
is A 5. g(x) 6. a. 0, 6, -4; 3 x-intercepts b. $\frac{1}{2}$, -7, 5; 3 x-intercepts c. 0, -3, $-2 \pm \sqrt{10}$; 4 x-
intercepts d. $-\frac{1}{2} \pm \frac{\sqrt{11}i}{2}$, $\frac{1}{2}$; 1 x-intercept.